



# COMPARING NUTRITIONAL STATUS OF HOSPITALIZED ELDERLY PATIENTS WITH THEIR FUNCTIONAL STATUS

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**Abstract:** This study has been undertaken to assess the nutritional and functional status of hospitalized elderly patients and whether their nutritional status was affecting functional status. 50 elderly patients (>60 years old) admitted at Masina Hospital for medical treatment were included. Nutritional assessments include Mini nutritional assessment (MNA) and Nutritional checklist (NCL), whereas Barthel index were used for functional assessment and symptoms, biochemical parameter was also noted. Information was collected from the patients, their relatives and responsible staff. Chi Square test was used to compare the nutritional and functional assessment. According to the NCL 38% of participants were at high risk, 40% were at moderate risk of malnutrition, and 22% had good nutrition. There was a high nutritional risk in patients with low income. As per MNA grading, 28% were at risk of malnutrition, 46% were malnourished and 26% were having normal nutritional status. There was significant co relation ( $p < 0.05$ ) found between nutritional and functional status of patients. Barthel index score was significantly lower in those at high risk of malnutrition. Biochemical parameter of the patients revealed that hemoglobin, protein and albumin were lower in majority of the subjects. There was a significant difference between age and hemoglobin and albumin levels ( $p < 0.05$ ). More than half of the subjects suffering from constipation, weight loss, chewing difficulty and gas & bloating. There is an interrelationship between the nutritional status of the elderly and reduced functional capacity. Therefore, early nutritional assessment and nutritional care plan is important for this vulnerable group.

**Index Terms - Nutritional assessment, malnutrition, functional status.**

## INTRODUCTION

Aging is associated with various physiological changes and needs, which make elderly people vulnerable to malnutrition<sup>1</sup>. Multi-morbidity associated with increasing age is common and is found to be more frequent in resource-poor countries<sup>2</sup>. The magnitude of malnutrition among the elderly in India is under-reported. The few studies that have been done showed that more than 50% of the older population is underweight and more than 90% has an energy intake below the recommended allowance<sup>3,4</sup>.

Malnutrition is a major geriatric problem associated with poor health status and high mortality, and it also has an impact on patient's nutritional status<sup>5</sup>. It also cause decline in general functional status and decreased bone mass, immune dysfunction, delayed post surgery recovery, high hospitalization and readmission rates, and increased mortality rate<sup>6</sup>. Therefore, malnutrition is a prognostic factor associated with morbidity, mortality, and costs of care<sup>7</sup>. Elderly populations are more prone to nutritional deficiencies<sup>8</sup>, as aging may come with an accumulation of diseases and impairments. These include cognitive and physical decline, depressive symptoms, emotional variations, and

poor oral health, along with socioeconomic changes<sup>8,9,10</sup>. Even in cases of adequate nutrient and energy intake, the nutritional status of older adults can be challenged by a compromised nutrient metabolism (such as absorption, distribution, storage, utilization, and excretion), drug–nutrient interactions, or altered nutrient needs<sup>11</sup>, suggesting that there is a relationship of interdependence with the other factors. Thus, the objective of this study was to assess the relationship between nutritional status and indicators of functional capacity among recently hospitalized elderly patients in a hospital setup.

## Methodology

An Observational study was done from May 2019 to September 2019 with 50 elderly aging more than 60 years, of both genders, admitted at Masina Hospital for medical treatment. All patients aged 60 or more years and who stayed in the hospital for one or more days were included in the study. Patients who required treatment in specialized units such as the intensive care units and on Ryle's Tube feeding were excluded. The work only began after the patient or caregiver was informed of the purpose of the study and agreed to participate, signing a informed consent form.

Subjects were classified according to age as follows, young old (65–74.9 years), old old (75–84.9 years), and oldest old ( $\geq 85$  years)<sup>12</sup>. Kuppuswamy's Socioeconomic Status Scale is used in the urban population, for assessment of the socioeconomic status<sup>13</sup>.

The MNA developed by Guigoz et al., was used for the subjective assessment of the nutritional status<sup>14</sup>. It includes questions regarding weight change, dietary change, gastrointestinal symptoms that persist for more than two weeks, functional capacity, physical assessment and disease and its relationship with nutritional requirement. MNA is composed of 18 questions which are divided into four main categories; dietary assessment, subjective assessment, global assessment and anthropometric data. It gives a maximum of 30 points and it classifies the elderly in: malnourished (MNA < 17 points), at risk of malnutrition (MNA: 17–23.5) and well nourished (MNA  $\geq 24$  points)<sup>14</sup>.

NCL was used for nutritional screening which included 10 items with a total score of 21 points<sup>15</sup>. A score from 0 to 2 was considered as good nutrition, 3 to 5 as moderate nutritional risk, and 6 or more as high nutritional risk. The nutritional checklist includes illness and tooth or mouth problems affecting feeding, number of meals per day, and types of foods and drinks, also ability to eating alone, to cook shop or feed oneself, and weight gain or loss, was included<sup>15</sup>.

Functional capacity indicators were assessed based on the Barthel self-care index of activities of daily living, first developed in 1965<sup>16</sup> and later modified by Granger et. al,<sup>17</sup>.

Symptoms and biochemical parameter of patients were also noted. Information was collected from the patients, their relatives and responsible staff.

The data were analyzed with the elderly divided into groups according to their age and nutritional status. The answers to the questionnaire were expressed in numbers and percentages and compared. The proportions were compared by the chi-square test. For all analyses, P value <0.05 was considered statistically significant.

## Result

A total of 50 subjects were included in study in which 62% were male and 38% were female. The admission was due to gastrointestinal troubles in 18 patients, cardiac troubles in 10, chest troubles in 11, neurological in 5, or other causes in 6 patients.

According to age categorization 60% were belonging to young old, 28% were old old and 12% were belonging to oldest old category. As per Kuppuswamy's Socioeconomic Status Scale majority of population were belonging to lower middle class (40%). As for marital status, 70% were married, 20% were widowed and 10% were unmarried. The majority of patients had completed primary education (26%) and only 12% were on regular exercise (Table no-1).

**Table no. 1: Demographic data**

Data	No.	%
<b>Gender</b>		
Male	31	62
Female	19	38
<b>Age</b>		
Young old (65–74.9 years)	30	60
Old old (75-84.9years)	14	28
Oldest old (> 85 years)	6	12
<b>Education</b>		
Illiterate	8	16
Primary	13	26
Middle	12	24
High school	11	22
Intermediate	4	8
Graduate	1	2
Processional degree	1	2
<b>Marital status</b>		
Married	35	70
Unmarried	5	10
Widow	10	20
<b>Exercise</b>		
Yes	44	88
No	6	12

Among the chronic diseases and conditions (one or more conditions in the same individual) of all the assessed individuals, systemic hypertension ranked first (78%), followed by diabetes mellitus (64%), ischemic heart disease-IHD (40%), chronic kidney disease- CKD (12%) and others such as asthma, hypothyroidism, hyperthyroidism, psoriasis and pyelonephritis were also noted. (Figure no.-1)

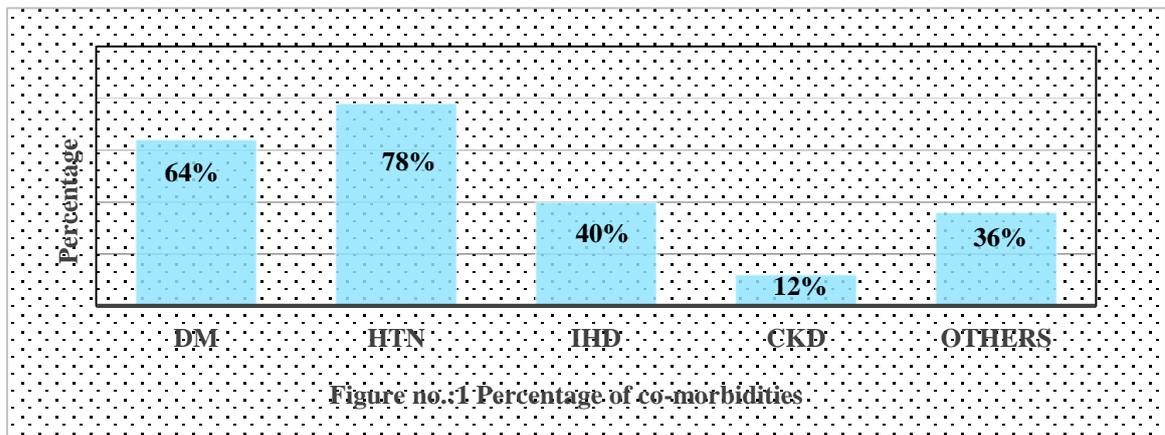


Figure no.:1 Percentage of co-morbidities

Biochemical parameter of the patients revealed that hemoglobin, protein and albumin were lower in majority of the subjects where as creatinine was in the normal range in majority (figure no.: 2).

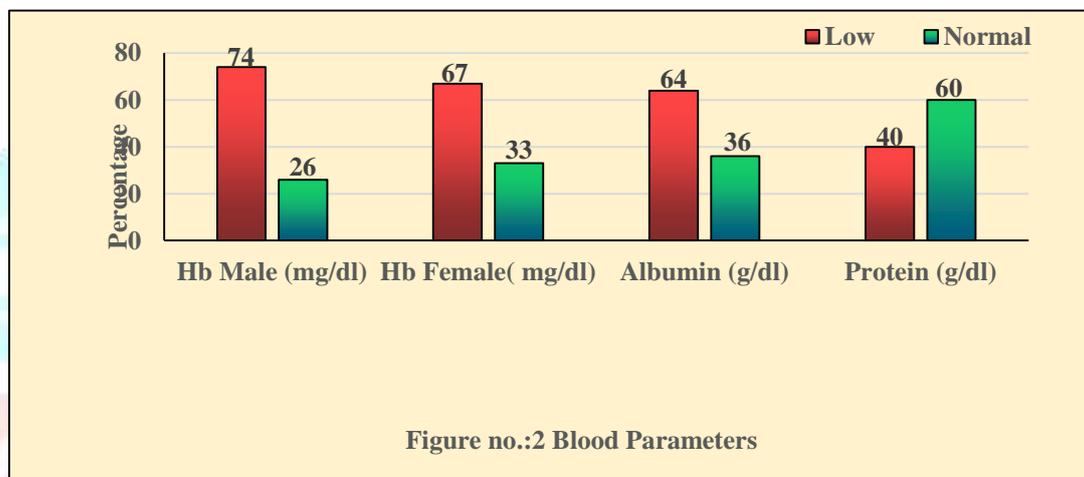


Figure no.:2 Blood Parameters of the Patients

Figure No.3 shows the symptoms observed in subjects. More than half of the subjects suffering from constipation, weight loss, chewing difficulty and gas & bloating. Other symptoms such as loss of appetite, oliguria, weakness, malena, breathlessness and dizziness were also observed.

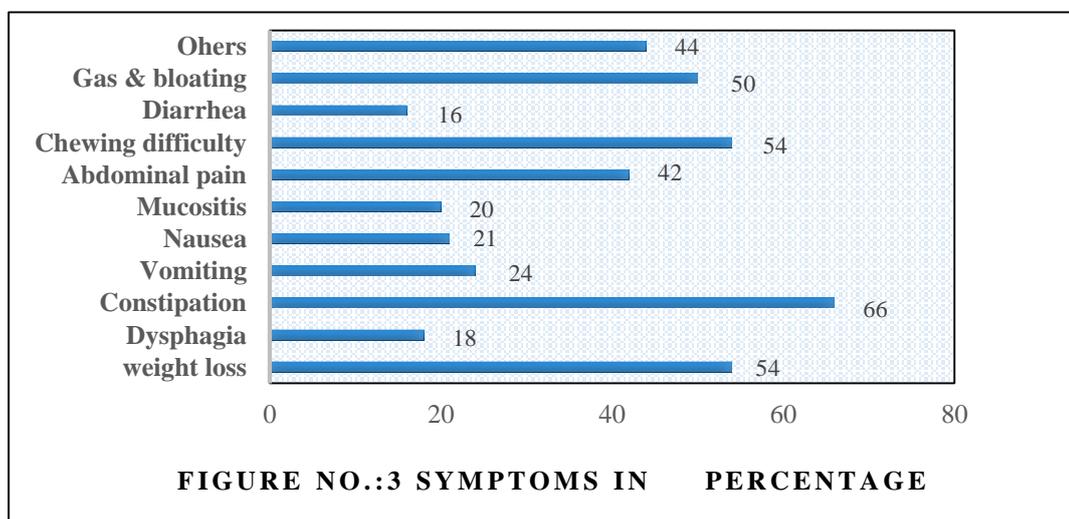


Figure no.:3 Symptoms in Percentage

Figure No.4 depicts the body composition observed among the subjects. 34% subjects had loss of subcutaneous fat, 42% subjects had loss of muscle mass whereas 18% had edema.

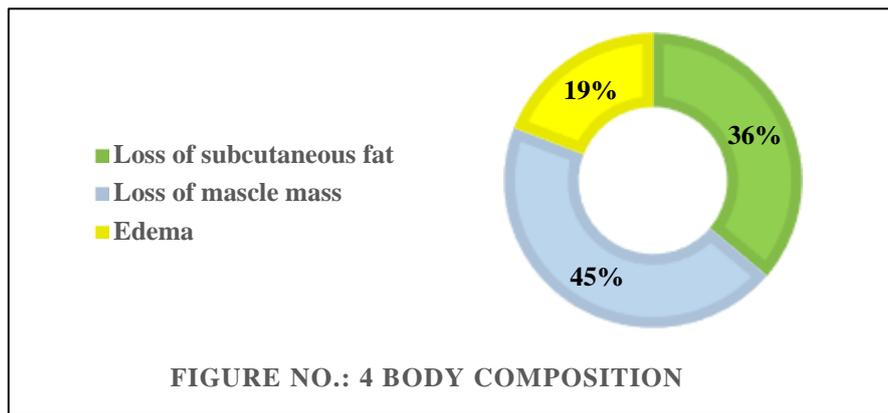


Figure no.:4 Body Composition of the Patients

Figures 5 and 6 described the comparison between education and nutritional status. We found that high nutritional risk represented 62% and 63% in illiterate patients as per MNA and NCL respectively. Comparatively, among professional degree holder elderly patients, 100% were well nourished according to MNA and NCL both. There was significant correlation found between education and nutritional status of subjects ( $p < 0.05$ ).

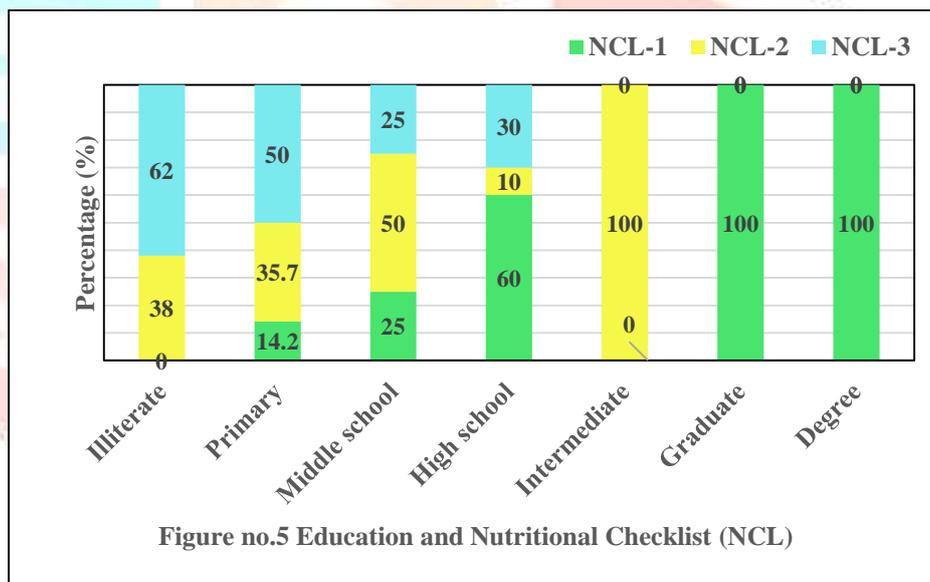


Figure no.:5 Educational status and Nutritional Checklist (NCL)

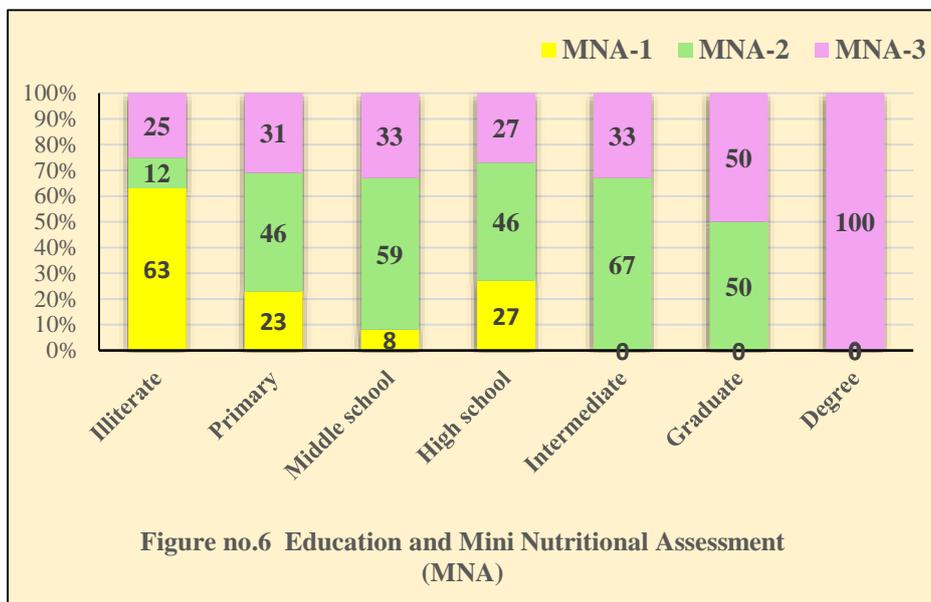


Figure no.:6 Educational status and Mini Nutritional Status (MNA)

Figure No. 7, same as mentioned above represents nutritional assessment according to MNA and NCL of the subjects. It shows that 38 % and 28% were at high risk or malnourished as per NCL and MNA respectively.

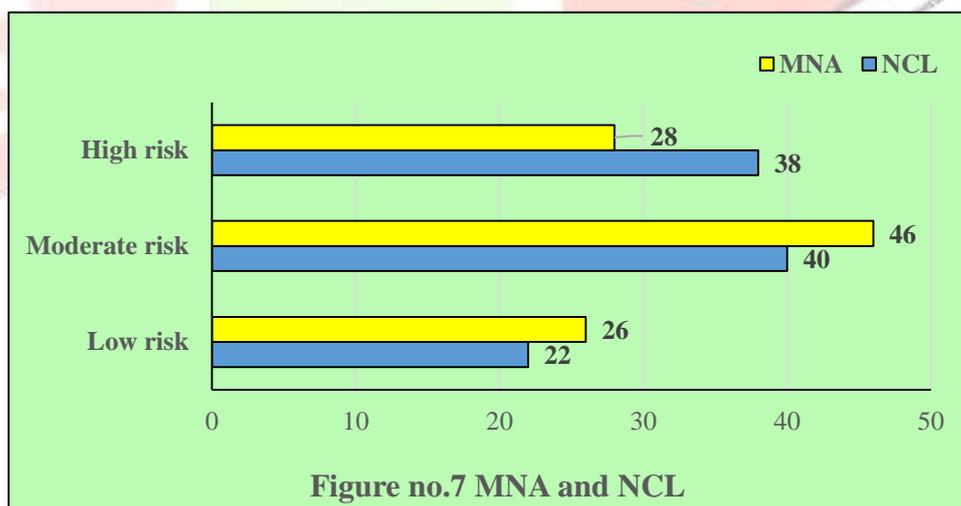


Figure no.7 Comparison of MNA and NCL

Low Barthel Index score-1 was observed majorly in both MNA and NCL malnourished group i.e. 54% and 63% respectively (fig. no. 8). A significant association between nutritional status and Barthel Index score ( $p < 0.01$ ) indicates that both nutrition and functional ability go together.

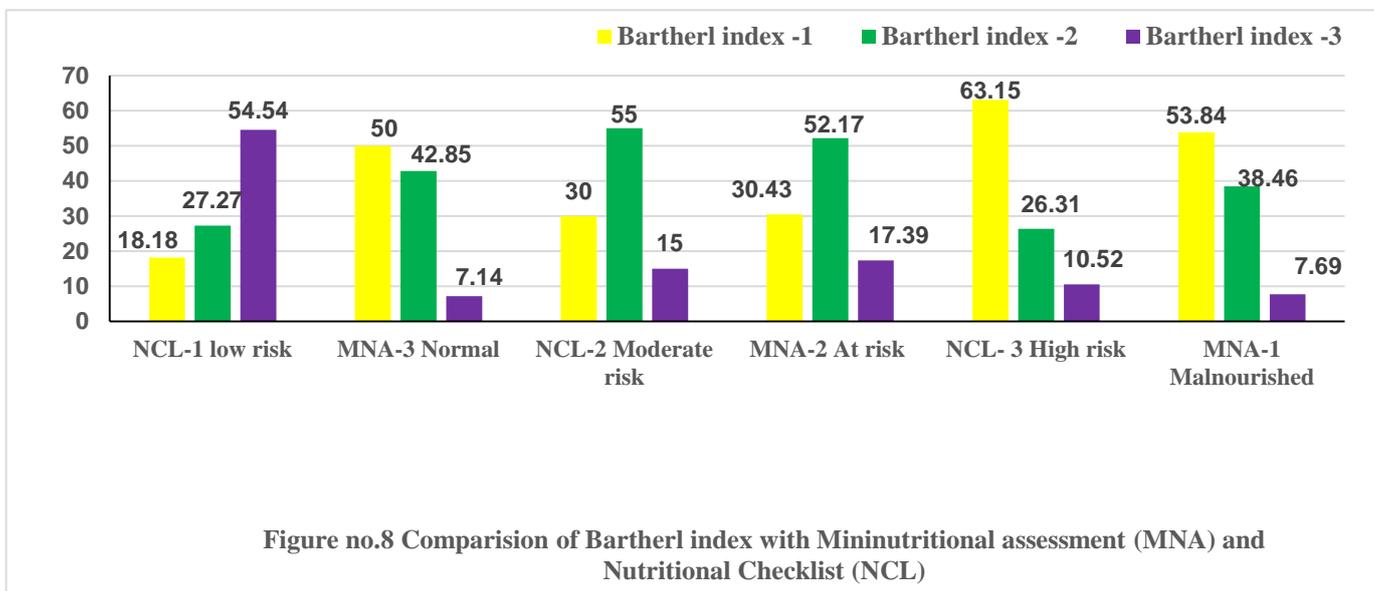


Figure no.:8 Comparison of Bartherl index with Mininutritional assessment (MNA) and Nutritional Checklist (NCL)

## Discussion

This study presents data that assessed the relationship between nutritional status and functional capacity of hospitalized elderly and there is clearly the need to improve the knowledge on the mechanism. In Brazil, deaths associated with malnutrition among the elderly bring to light the discussion on the need to watch this population and intervene nutritionally whenever necessary<sup>18</sup>. Aging and consequently frailty progress, can be indirectly related to the development of malnutrition caused by health decline, which comes with onsets of physical and psychological diseases, increased medication intake, cognitive impairment, and dementia<sup>19</sup>. Although one could expect a great number of diseases to be related to malnutrition development, only Parkinson disease, constipation<sup>19</sup>, and basal oral dysphagia and signs of impaired swallowing<sup>20</sup> were observed to have a significant impact on the nutritional status of elderly. In our study similar symptoms such as constipation, chewing difficulty, gas and bloating were found in majority of patients, which might affect their nutritional status. In our study symptoms such as constipation, chewing difficulty, gas and bloating were found in majority of patients, which might affect their nutritional status. Nutritional inadequacy can be caused by one or more factors such as physiologic, pathologic, sociologic and psychologic. Underlying medical treatment and pathology can directly cause anorexia and malnutrition<sup>21,22</sup>. Prevalence of weight loss was high (54%) in our study.

NCL was designed to be self-administered, could also be administered by a health care professional<sup>23</sup>. The prevalence of under nutrition and nutritional risk was 17.8% and 41.5%, respectively, using the NCL in china<sup>24</sup>. The MNA is a short, non-invasive, reliable and extensively evaluated nutritional assessment tool for elderly populations<sup>14</sup>. A study in Makkah found that among 102 recently hospitalized elderly and according to the mini nutritional assessment (MNA) tool, 22.6% were classified as malnourished, 57.8% were at risk of malnutrition, and 19.6% were well nourished<sup>25</sup>. Also, another study found that 10.2% of elderly individuals were malnourished and 39.9% were at risk of malnutrition according to the MNA screening tool<sup>26</sup>. In our study 28% were classified as malnourished, 46% were at risk of malnutrition, and 26% were well nourished according to the MNA tool. Differences in prevalence rates of malnutrition among the different studies may be due to difference in selection criteria of elderly, different assessment tools, and differences in sociodemographic variables.

In this study, there was an association between NCL and, MNA with age group. We found that 78% and 66% of the oldest old had high nutritional risk according to NCL and MNA respectively. Whereas in old old group 33% and 22% were at moderate risk of malnutrition as per NCL and MNA respectively. Among young old group 27% and 33% were well nourished as per NCL and MNA respectively. Our results agree with that obtained by Fang et

al. who found that the prevalence of nutritional risk was significantly higher in patients >70 years of age than in patients <70 years (64% versus 32%,  $P < 0.001$ )<sup>27</sup>. Yap et al. found that high nutritional risk was more in older patients but with no significant association with age<sup>28</sup>.

In this study we found that high nutritional risk represented 62% and 63% in illiterate patients as per MNA and NCL respectively. Comparatively, among professional degree holder elderly patients 100% were well nourished according to MNA and NCL both. Due to small sample size, we cannot depend on this finding. However, the previous study found no significant correlation between NCL and education<sup>28</sup>.

As regards functional assessment, the Barthel self care index of activities of daily living was used. In this study, we found a significant correlation between disability and age, where functional activity decreased with advancing age. Low Barthel Index score-1 was observed majorly in both MNA and NCL malnourished group i.e. 54% and 63% respectively. A significant association between nutritional status and Barthel Index score ( $p < 0.01$ ) indicates that both nutrition and functional ability go together. Hairi et al. showed that advancing age was significantly associated with functional limitation<sup>29</sup>. Increased incidence of disability was associated with malnutrition in this study. These results agree with Oliveira et al. who assessed the relationship between nutritional status and indicators of functional capacity among recently hospitalized elderly in a general hospital, and showed that these indicators were significantly more deteriorated among the malnourished individuals<sup>30</sup>. Using mini nutritional assessment (MNA) and Barthel index on 123 resident elderly, Cereda et al. showed that the poorer functional status was associated with low nutrition<sup>31</sup>. Functional capacity assessment tools have been included in studies that seek to assess nutritional risk.

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